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IS 15978 (2012): Cyphenothrin, Technical - [FAD 1: Pesticides and Pesticides Residue Analysis]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
साइफेनोथ्रिन, तकनीकी — विशिष्टि

Indian Standard
CYPHENOTHHRIN, TECHNICAL — SPECIFICATION

ICS 65.100.30

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BUREAU OF INDIAN STANDARDS
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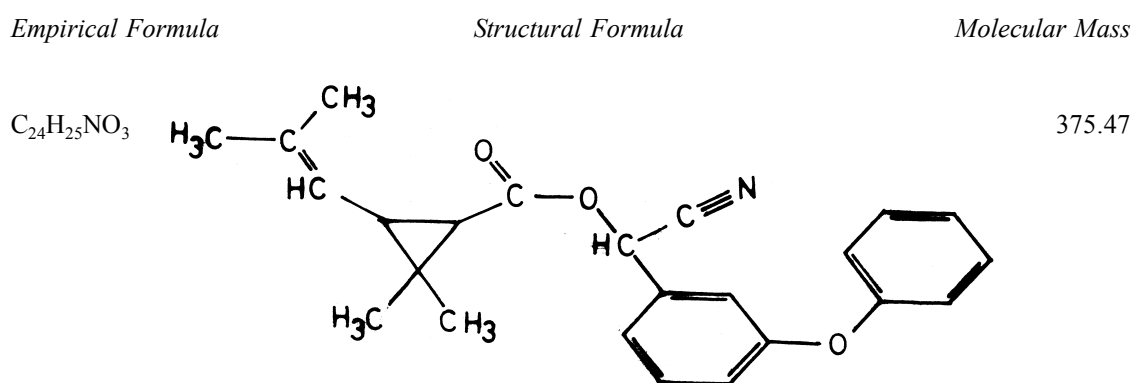
FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides and Pesticides Residues Analysis Sectional Committee had been approved by the Food and Agriculture Division Council.

Cyphenothrin, technical is used in the preparation of insecticidal formulations for agricultural use.

Cyphenothrin is the accepted common name by the International Organization for Standardization (ISO) for (*RS*)- α -cyano-3-phenoxybenzyl (*1RS*)-*cis-trans*-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate.

The empirical and structural formulae and the molecular mass of cyphenothrin are given below:



In the formulation of this standard, due consideration has been given to the provisions of the *Insecticide Act*, 1968, and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under the *Insecticides Act* and Rules, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CYPHENOTHRIN, TECHNICAL — SPECIFICATION

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for cyphenothrin, technical.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
1070 : 1992	Reagent grade water (<i>third revision</i>)
6940 : 1982	Methods of test for pesticides and their formulations (<i>first revision</i>)
8190 (Part 1) : 1988	Requirement for packing of pesticides: Part 1 Solid pesticides (<i>second revision</i>)
10946 : 1996	Methods of sampling for technical grade pesticides (<i>first revision</i>)

3 REQUIREMENTS

3.1 Description

The material shall be in the form of white beige coloured homogenous powder. It shall be free from extraneous impurities and hard lumps.

3.2 The material shall also comply with the requirements given in Table 1.

Table 1 Requirements for Cyphenothrin, Technical

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex	Clause No. of IS 6940
(1)	(2)	(3)	(4)	(5)
i)	Cyphenothrin content, percent by mass, <i>Min</i>	92	A	—
ii)	Moisture content, percent by mass, <i>Max</i>	1.0	—	4
iii)	Material insoluble in acetone percent by mass, <i>Max</i>	Nil	—	9
iv)	Acidity (as H ₂ SO ₄), percent by mass, <i>Max</i>	0.1	—	11.3.2

4 PACKING

The material shall be packed in lacquer coated mild steel container of 20 litre capacity or polypropylene drum of 20 litre capacity. The container shall also meet the general requirements given in IS 8190 (Part 1).

5 MARKING

5.1 The containers shall be securely closed and the following information shall be marked legibly and indelibly on each container in addition to any other information as is necessary under the *Insecticides Act*, 1968 and Rules framed thereunder:

- a) Name of the material;
- b) Name and address of the manufacturer;
- c) Batch number;
- d) Date of manufacture;
- e) Date of expiry;
- f) Net quantity;
- g) Nominal cyphenothrin content, percent (*m/m*);
- h) Cautionary notice worded as in the *Insecticides Act*, 1968 and Rules framed thereunder; and
- j) Any other information required under the *Standards of Weights and Measures (Packaged Commodities) Rules*, 1977.

5.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 10946.

7 TESTS

7.1 Tests shall be carried out in accordance with the method referred in col 4 and col 5 of Table 1.

7.2 Quality of Reagents

Unless specified otherwise, pure chemicals and reagent

grade water (*see* IS 1070) shall be employed in the tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

[Table 1, *Sl No.* (i)]

DETERMINATION OF CYPHENOTHRIN CONTENT

A-1 PRINCIPLE

Cyphenothrin content is determined by gas chromatography using internal standard technique.

A-2 APPARATUS

A-2.1 Gas chromatograph (GLC) equipped with flame ionization detector (FID) and coupled to a printer-plotter-cum-integrator or PC based data system is used for this determination. The suggested operative parameters are as follows, but can be changed, if necessary, provided standardization is done:

Column	:	DB-1 megabore column, length = 30 m, 0.53 mm i.d. × 1.5 µm film thickness or equivalent
Temperature conditions	:	Oven — 250°C Injector — 280°C Detector — 300°C

Gas flow rate :	Nitrogen (N ₂)	— 10 ml/min
	Hydrogen (H ₂)	— 50 ml/min
	Air	— 400 ml/min

Injection volume : 1 µl

Retention time : a) Cyphenothrin — 7.6 min
(Guide values) (approximately)

b) Dicyclohexyl phthalate —
5.3 min (approximately)

A typical GC chromatogram of cyphenothrin with internal standard is given in Fig. 1.

A-2.2 Standard Glassware

A-2.3 Microlitre Syringe

A-3 REAGENTS

A-3.1 Acetone — AR grade or equivalent.

A-3.2 Internal Standard — Dicyclohexyl phthalate AR grade or equivalent.

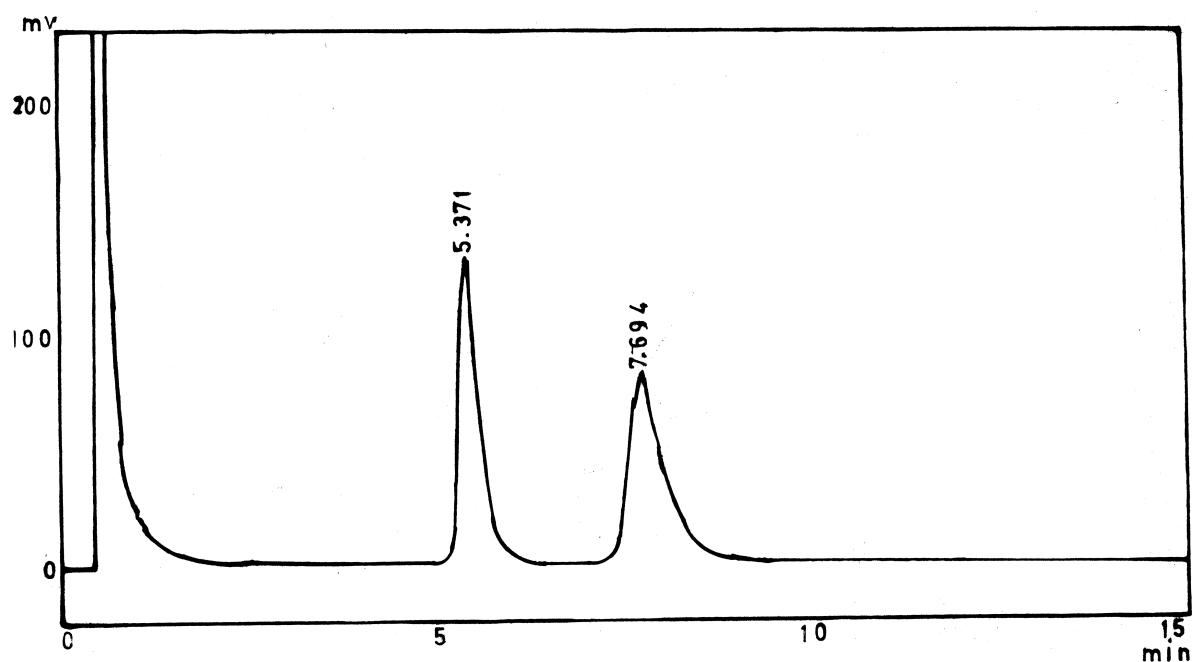


FIG. 1 TYPICAL CHROMATOGRAM

A-3.3 Cyphenothrin Analytical Standard, of known purity.

A-4 PROCEDURE

A-4.1 Preparation of Internal Standard Solution

Weigh accurately 2 g of dicyclohexyl phthalate into a 100 ml volumetric flask. Dissolve in acetone and make up the volume up to the mark with acetone. Shake well to homogenize.

A-4.2 Preparation of Standard Solution

Weigh accurately 0.1 g of cyphenothrin analytical standard of known purity into a 50 ml volumetric flask. Add 5ml of dicyclohexyl phthalate (internal standard) solution and make up the volume up to the mark with acetone. Shake well to homogenize.

A-4.3 Preparation of Sample Solution

Weigh out accurately a sample quantity so as to contain 0.12 g of cyphenothrin in a 50 ml volumetric flask. Add 5ml of dicyclohexyl phthalate (internal standard) solution and make up the volume up to the mark with acetone. Shake well to homogenize.

A-5 ESTIMATION

Inject 2 µl of reference standard solution until the area quotients of internal standard/reference standard of two successive chromatograms do not deviate from each other by more than 2 percent. Then use the following injection sequence:

..... $C S_1 S_1, C S_2 S_2, C S_3$

where

C = standard solution; and

S = sample solution (1, 2,... n).

From the chromatograms of the standard solution and sample solution, measure the peak areas of the internal standard and cyphenothrin peaks, and compute the percentage of the cyphenothrin as given in A-6.

A-6 CALCULATIONS

$$\begin{array}{l} \text{Cyphenothrin content,} \\ \text{percent by mass} \end{array} = \frac{M_1 \times A_1 \times A_3}{M_2 \times A_2 \times A_4} \times P$$

where

M_1 = mass of cyphenothrin in standard solution, in g;

M_2 = mass of the sample taken for test, in g;

A_1 = peak area of cyphenothrin in the chromatogram of standard solution;

A_2 = peak area of cyphenothrin in the chromatogram of sample solution;

A_3 = peak area of internal standard, dicyclohexyl phthalate, in the chromatogram of standard solution;

A_4 = peak area of internal standard, dicyclohexyl phthalate, in the chromatogram of sample solution; and

P = percentage purity of the cyphenothrin in reference analytical standard.

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This Indian Standard has been developed from Doc No.: FAD 1(1913).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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